

# TENCompetence tools and I\*Teach methodology in action: development of an active web-based teachers' community

Education is not a preparation for life;  
it is life itself. (John Dewey)

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**Abstract:** The article presents an example of how Information and Communication Technologies (ICT) can enhance the process of teacher training, and how this can be used for lifelong competence development for teachers. The paper describes the goals, settings, implementation and results of a pilot teachers' training realized within the frame of the European project TENCompetence. ICT tools developed in TENCompetence project were used to support the introduction to the I\*Teach didactical methodology developed in the frame of I\*Teach Leonardo project. It became clear that the ICT tools and didactical methodology offer a strong support for teachers' professional development.

**Keywords:** lifelong learning, teachers' training, active learning methods, competence development

## Introduction

In the past years, Bulgarian Ministry of Education and Science (MES) developed and started a global strategy for implementation/introduction of information and communication technologies (ICTs) in educational processes. The adequate use of ICTs in education motivates students by providing more attractive and effective ways of study supported by multimedia demonstrations and visualizations of learning content, interactive applications for self-exploration, and knowledge about recent achievements in particular subject areas.

In order to realize this strategy, teachers should first of all be ready to use ICTs in their lessons, as well as to sustain and deploy their professional competences. They need to be familiarized with different ICTs, to have tools for lifelong self development, and to master didactical methodologies for applying ICTs in education.

Working in close collaboration with MES, we organized series of pilot teacher trainings (pilots), in which we combined the products of two European projects – TENCompetence, providing technical and organisational infrastructure, and I\*Teach, offering a new didactical methodology for teaching *soft* skills (Stefanova E., Sendova E., v. Diepen N., Forcheri P., Dodero G., Miranowicz M. & Brut M., 2007) This article presents the third pilot teacher training, which used an enhanced version of the TENCompetence infrastructure, improved as a result of analysis of the first and second pilot trainings (Schoonenboom J., Sligte H., Hernández-Leo D., Moghnieh A., Stefanov K., Glahn C., Specht M. & Lemmers R., 2008; Stefanov, K., Nikolova, N., Ilieva, M. & Stefanova, E., 2008).

Each of pilots used the TENCompetence Personal Competence Manager (PCM) available at the time of the pilot (2007, 2008 and 2009). During the third pilot, the infrastructure included not only functionalities related to the creation and performance of the Personal Development Plan (PDP), but

also means for searching and sharing resources (LearnWeb2.0), and user orientation of her/his learning goals (GOT).

### **TENCompetence project**

The TENCompetence project is a four-year project in the European Commission's 6<sup>th</sup> Framework programme, within the priority IST/Technology Enhanced Learning. The aim of the project is to design a technical and organisational infrastructure for lifelong competence development. The project develops new innovative pedagogical approaches, assessment and organisational models, and it creates a technical and organisational infrastructure, which integrates existing isolated models and tools for competence development into a common framework (TENCompetence Foundation, 2009).

The infrastructure uses open-source, standards-based, sustainable and innovative software technology. With this freely available software infrastructure, the European Union aims to boost the European ambitions towards Knowledge Society by providing to all European citizens and other organisations an easy access to facilities that enable lifelong development of competences and expertise in the various occupations and fields of knowledge. The purpose of the development of the TENCompetence Integrated System is to provide a software framework for the effective and efficient support of users who create, store, use and exchange knowledge resources, learning activities, units of learning, competence development programmes, and networks for lifelong competence development. The main TENCompetence components are Network of Learning, Competence Development programmes, Unit of Learning, and Knowledge Resources (Stefanov K., Naskinova I. & Nikolov R., 2007).

### **I\*Teach**

The *Innovative Teacher (I\*Teach)* (Innovative teacher: I\*Teach Leonardo project, 2006) project was a pilot project launched in October 2005 under the Leonardo da Vinci programme. It was oriented towards the European Council Lisbon meeting (2000) guidelines for lifelong learning and using ICTs in education.

The first goal of the project was identifying the most important skills which one has to possess to receive better realization in the information society. These skills are also called *soft skills* (related to motivation, integration, communication, sociability), in contrast to the *hard skills* (related to the ability to perform well in a specific context or job). After profound/exhaustive exploration, four groups of *soft* (non-technical) skills were identified:

- **Working-on-a-project skills** – rationalization of the main task, creating a work plan, defining subtasks and sub-products, integrating results, keeping track of the progress, analyzing the whole process etc.
- **Information skills** – ability to determine the information problem, collect and process appropriate information, to evaluate information, to extract the most important information, to use appropriate technical tools for searching and systematisation of information.
- **Working-in-a-team skills** – skills of internal and external communication, ability to give/receive feedback, to support the other members of the team, to define and keep own role, to take responsibility.
- **Presentation skills** – ability to choose the appropriate presentation media and appropriate design, to command language and behaviour, to make correct citations etc.

The next outcome of the I\*Teach project, presented by Stefanova et al. (2007) is a methodological framework defining a way of teaching these skills. The framework is based on active methods of learning, especially on project-based learning. Its main characteristics are initial *challenge*, final *product*, and intermediate *milestones*. The challenge should be attractive and motivating for the learners. The final and intermediate products are required to correspond to the particular discipline.

The learners are free to choose their own way through the milestones to the final product improving their soft skills by the aid of the teacher.

## **Hypothesis**

We aim to prove the significance, usability and effectiveness of TENCompetence software platform and methodology used for complex competence development programmes in authentic learning settings. At this stage, there is no appropriate software platform and tools aiming to fully support the I\*Teach Methodology, so we expected that the use of the TENCompetence platform would significantly improve the way teachers adopt the I\*Teach methodology.

During the pilot we tried to answer the following questions:

- Do the TENCompetence tools provide flexibility of the time management and organisation for self-education?
- Do the TENCompetence tools provide means of control the self-education?
- Do they help teachers to easily orient where to find relevant high quality learning materials?
- Do they provide an appropriate environment for study how to apply I\*Teach methodology?
- Do they ensure means of experience exchange and collaborative work?

## **Methodology**

The pilot used the following types of learning:

- project-based learning
- problem-based learning
- active learning
- self-organized learning
- communities of practice
- knowledge management

The main competences involved are the so-called enhanced competences and skills, which are an extension of the *soft* skills by the usage of ICT.

The four main competences corresponding to the I\*Teach methodology were included in this pilot:

- How to teach information skills using ICT
- How to teach presentation skills using ICT
- How to teach working on a project skills using ICT
- How to teach working in a team skills using ICT

Each one is further sub-divided in other sub-competences.

For each main competence we have developed a competence profile, and for each competence profile - several competence development programmes.

The training was conducted in two phases: short two days face-to-face stage of tutored learning followed by two weeks distance education. Learners were asked to fill in pre- and post-test questionnaires.

## **The (Lifelong) Learners**

A total of 30 teachers of different subject areas, 28 women and 2 men, started the competence development in the ICT pilot. Their mean age is 44,1 years with a standard deviation of 6,4 years; all participants are between 30 and 57 years old. The median lies at 44 years old. All participants live in Bulgaria.

Twenty-four of the 30 participants hold a University Master's degree, 5 - a Bachelor's degree, and one participant holds a PhD. All 30 said that their profession is a teacher, and 29 said the same about their current job function. One person was a deputy headmaster.

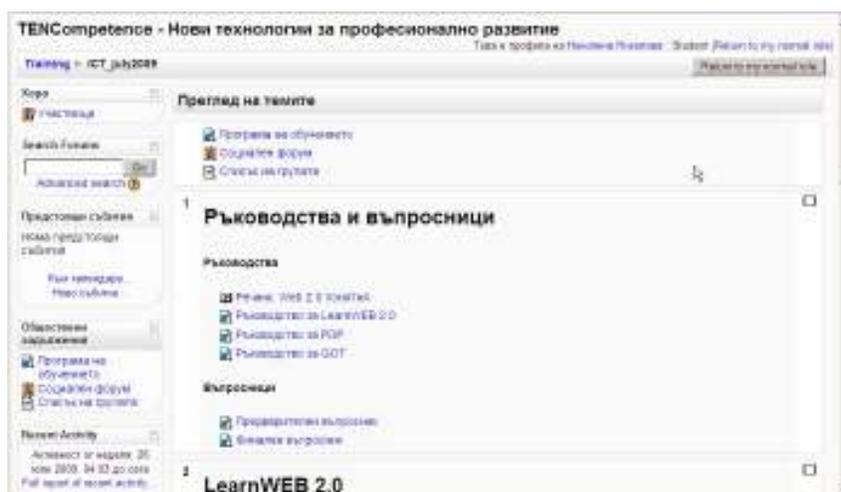
The results of the pre-test showed that most of the respondents (approximately 83%) considered themselves beginners or intermediate with respect to the ICT enhanced competences described above.

Although most of the participants (86,6%) often use a computer in their daily life, nearly 50% had little or non e experience with using a virtual campus. In addition, 10% of the trainees indicated to have never participated in a competence-based training.

As for the preferred style of learning, 46% of the group liked structured education with an outlined path to be followed, while 20% would like to see outlined path but also to have a choice of their own path. As 30% did not share any opinion, we tried to prepare a learning environment that could satisfy both styles of learning.

### ***Learning resources and tools***

We used Moodle to act as a Course management system. The educational scenario was described and further elaborated on by presentations, handbooks, and assignments. The learning materials were published in Moodle: electronic versions (*ppt* and *doc* format) of the printed handbooks in Bulgarian language, Moodle's web 2.0 glossary, assignments for the face-to-face sessions, and a final project assignment. A discussion forum was included, too.



*Fig. 1: Moodle e-learning environment*

The following TENCompetence tools were available to be used and mastered during the pilot:

- **Personal Competence Manager (PCM):** This tool was used by the trainers to create relevant Competence Profiles and Competences.
- **LearnWeb2.0:** the tool was used to search for relevant multimedia resources, for evaluation and comments about resources, as well as for publishing own materials. Its use was essential for all the tasks and studying projects.



Fig. 2: LearnWeb: Resources added by teachers

- Personal Development Plan (Web PDP):** This was the basic tool for presenting the ideology of the I\*Teach methodology. The trainees used a preliminary created profile and basic plan to evaluate their own competences, adapt the plan, add useful resources and implement the plan. The associated blog was used for sharing experiences.

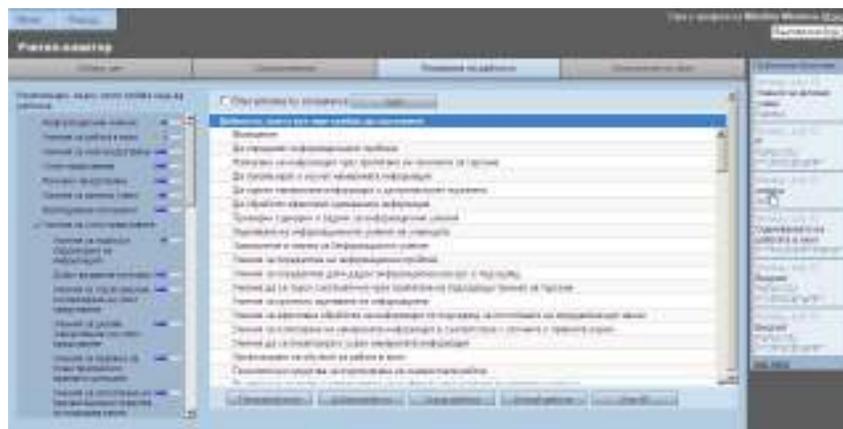


Fig. 3: Web PDP: I\*Teach Methodology personal development plan

- Goal Orientation Tool (GOT):** the favourite tool of the participants. They used it to find relevant communities and profiles, to get into contact with peers, and to see how people with similar professional interests develop their competences.

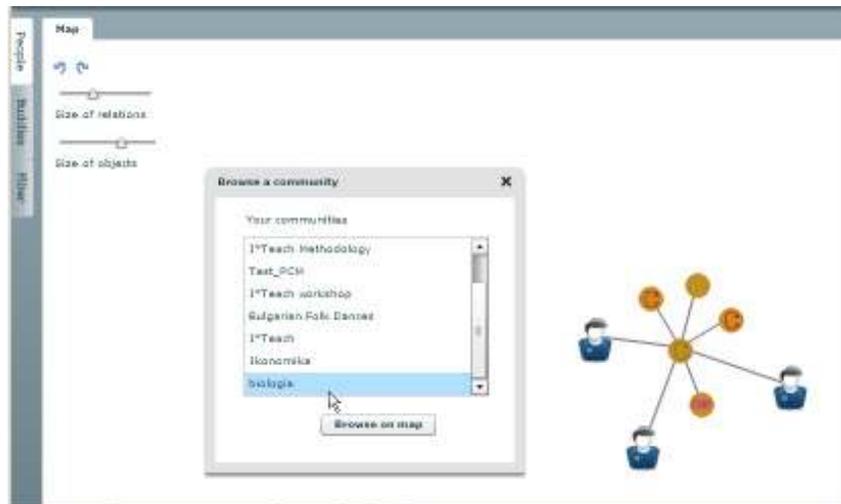


Fig. 4: GOT: Joining professional community

All these tools were used together in the context of the tasks given. For the introduction of/work on the assignments were used the PDP, LearnWeb and Goal Orientation tool, as well as web 2.0 applications – YouTube, Flickr, ipernity, Delicious, TENTube etc.

The participants adapted the basic personal development plan for studying I\*Teach methodology according to their knowledge and needs. They used the integrated blog to share useful learning resources found on the Web 2.0 applications by LearnWeb. They added comments, ratings and votes for others' comments to the found resources. Teachers found other people with the same or similar goals through the GOT tool, and used their experience for planning their self-training.

During the distance learning phase, the participants published their authored photos and videos in YouTube and Flickr, and described them in the LearnWeb tool.

### **Educational Scenario**

The educational scenario was based on a *learning-by-doing* approach. It was implemented in two stages – a short (2 days) face-to-face stage and a longer (2 weeks) distance learning phase.

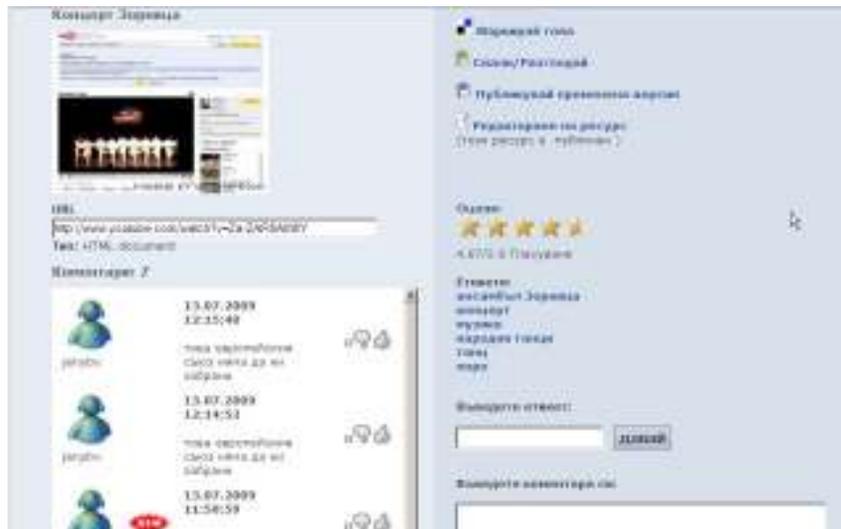
#### **Face-to-face stage:**

The face-to-face stage started by a presentation of participants – their names, subject area in which they teach, personal interests. The aim of the presentation was not only to *break the ice* but also to work more effectively by grouping together participants with common interests.

After the trainees' presentations, they were divided in two groups of 15 or 16 participants each. Each group was facilitated by two trainers.

First of all the trainees were familiarized with Web 2.0 terminology and concepts (blog, tag, folksonomy, etc).

The next step was to introduce the trainees to how to use the LearnWeb tool to search, evaluate, comment, and classify learning resources. The training was based on an assignment about improving folk dance skills. The topic was chosen on the basis of preliminary done inquiry about teachers' interests.



*Fig. 5: LearnWeb: Tagging and commenting a Folk Dances video lesson*

Familiarizing with the PDP tool was done through an assignment, in which the I\*Teach methodology and active methods of learning/teaching were studied. The task given to the participants was to evaluate their own skills, to adapt the provided basic development plan according to their needs and style of learning, and to implement the plan using the blog in which their progress and experience were shared. The link to LearnWeb was used for searching for useful learning resources.

Another task was to find buddies (using Goal Orientation tool) who also have interests in the I\*Teach methodology and to share the completed plans with them. Some teachers browsed the buddies' profiles using the TENTube tool.

The last assignment during the face-to-face stage was devoted to the art of carving. The teachers could study what is carving, its history, what instruments are used in this art, and to find pictures of international exhibitions. After that, they had to create a development plan and to find learning resources for studying the art of carving. The implementation of the plans was left for the distance learning phase.



*Fig. 6: LearnWeb: The art of carving*

**Distance learning stage:**

During the two weeks distance learning stage teachers had to complete the studying of carving art and to share pictures of their products and videos showing their progress.

Their final assignment was to create and implement their personal development plan related to the improvement of their professional skills in their teaching area. The plan had to be supported by relevant learning resources found on the web. Teachers were encouraged to share their experience and to collaborate with other teachers.

During the final meeting teachers showed their results and commented upon their progress, problems, and ways of solving.

### ***Evaluation methodology***

Quantitative data were collected by two questionnaires:

- a pre-test at the beginning of the pilot devoted to the participants' characteristics and expectations of the pilot;
- a summative evaluation of the pilot, which was completed by the participants in the last week of the experience. The questionnaire addressed the usefulness of the given tools and the level of satisfaction of the trainees.

The pre-test contained 27 short questions.

In addition to the personal characteristics (age, profession, educational degree, etc.) and their previous experience in web-based learning, we asked them to describe their willingness to acquire the following basic types of competences:

- Knowledge
- Functional skills- know how to do things
- Social skills
- Know- how to behave according to the rules and values of the profession
- Know- how to guide their future use by reflection on current practice
- Know- how to find creative solutions for problems related to this competence

We investigated their motivation to participate in the pilot (to keep up-to-date, to improve their current job level, to define new learning goals, to receive help on a non-trivial learning problem, or to explore the possibilities of a new field)

The summative evaluation questionnaire contained 64 questions addressing the users' opinion about the main functionalities of the presented TENCompetence tools, PCM, GOT, LearnWeb2.0 and Web PDP, in relation to competence-based learning such as self-assessment, adding, sharing, rating and commenting resources, voting, participating in blogs, activity planning and doing, etc.

The participants had to describe their overall impression of the difficulty and usability of the learning resources; they had to assess the level of user control over the learning process and the level of collaboration during the pilot. They were also asked whether they had encountered technical problems, whether they have liked competence-based learning, and whether they would continue to further develop these competences.

The participants also had to explain whether they have experienced any benefits from the training, in which areas and what types of competences they acquired (knowledge, functional, social skills, etc.)

Qualitative data were collected by a real time observation.

## **Results**

The observation showed that all the trainees participated actively in all activities during the pilot.



Fig. 7: Discussion about the relationship of the TENCompetence tools

The summative evaluation questionnaire showed that the participants spent 16 hours on average on the self-training sessions in the computer room (SD=1,74 hrs; Minimum=13 hours; Maximum =21 hours). The participants reported an average of 2,6 hours, with a minimum of 1 hour and a maximum of 6 hours spent at home or elsewhere.

The average appreciation was “they enjoyed this way of learning, with 84% . The rest is neutral, but none is negative. The large majority (87%) wanted to (definitely) further continue developing this competence(s) in the future, one person was not sure, and only two people (6%) did not want.

Although the participants showed a high level of satisfaction on the whole, 7 people said that their learning process was completely hindered by the technology. These technical problems could be explained by the context of the pilot. The participants had had some experience using computers; however they were not highly competent in using of ICT and, in particular, in using the learning systems. In addition some teachers believed that perfect ICT skills were in the foundation of the perfect teaching and pedagogical realisation. These teachers were almost *blocked* by the feeling that they were not ICT experts (Stefanova, Nikolova, Kovatcheva, Boytchev & Sendova, 2009).

With regard to the experienced benefits by the participation in comparison to the situation at the beginning of the pilot, it seemed that there were two groups: a group of 10 people who said that they experienced few benefits, and a group of 19 people who experienced many . Nine people of the first group indicated to have had large or complete technical hindrances. Of the group with many benefits, only two reported many technical problems.

When participants were asked in what areas they experienced benefits, most of them noted down improvement of their ICT, social and life skills, some of them marked their teaching areas, there were many answers related to the mastering of new didactical approaches, and several people indicated planning and organizing of own learning.

As for the learning resources, almost everyone found the resources interesting (90,3%) or very interesting (3,2%). Two participants were neutral. 90,3% said that the resources were (very) useful, the other 9,7% were neutral. The question whether the resources matched the learning needs was answered by 19,4% hardly, 6,5% moderately, 71% largely and 3,2% completely.

The evaluation of the tools showed that most of the trainees (excluding the people having had difficulty in the use of ICT in general) were very excited by the given tools, and stated that they continue to use them in their further professional development.

Finally, teachers shared some overall impressions of the pilot:

- This training was useful for getting to know new technologies and meeting colleagues with similar interests.
- New technologies, contacts with colleagues
- I like this course!
- Short but useful
- The education was very interesting, interactive and stimulating creativeness. It will be better if there are PCs appropriate to the software needs
- Useful for our further work
- Search for colleagues
- Suggestion for removing some bugs
- The training was very valuable because it gave us contacts with colleagues with similar interests. I learn how to find quickly useful information and how to share my knowledge, skills and competences.

Three people said: “Think well about the competences!”. Asking them what they mean, they shared that first of all they need to be trained in using a computer, and only after that – in social and pedagogical competences of using ICTs. Although there were large-scale ICT courses for teachers in Bulgaria, there still exists a need of improvement of computer skills for some of them.

## **Conclusions and comparison with previous ICT Teacher Training pilots**

The characteristics of the participants were similar in all three ICT Teacher Training pilots, in which the TENCompetence tools were used. The participants were highly educated middle-aged teachers interested in ICT but without being ICT experts. Their main motivation was job improvement and improvement of their proficiency level. 44 professional teachers were involved in Cycle 1 pilot, 136 in Cycle 2 pilot, and 32 in Cycle 3 pilot. There were only a few participants present in more than one pilot. The participants in the three pilots didn't differ much in the hours spent on competence development, being between 36 and 60 in the first pilot, between 40 and 60 in the second pilot, and between 15 and 23 in the third pilot. In the third pilot, presented in this paper, participants did not only devote time to competence development in the computer room where the PCM was available, but also at home (on average of 2,6 hours). This could be as a result of the Web aspect of the enhanced system but it also denotes the interest of the participants.

The analysis shows that Cycle 3 ICT teacher training pilot exceeds? the results of previous pilots. A large majority (84%) of the participants enjoyed this way of learning (very much) and (87%) wanted to (definitely) further continue developing this competence(s) in the future. They experienced benefits in different areas such as ICT, Mathematics, social skills, creating a self-development plan, self-assessment, implementation of new methods for self-improvement, working with tags, and working in web communities.

Some of them, especially those not reporting general technical problems, pointed out concrete benefits of their participation in the pilot in comparison to the situation at the beginning of the pilot. 73% of the participants let the system generate a plan based upon their self-assessment. 50% of the participants did not follow the activities as listed in the resulting outlined plan. This was by 30% more of the participants who had said that they prefer having the resources with an outline path but with the possibility of choosing their own path at the beginning of the pilot (only 20% said in the pre-test that this would be most supportive for their learning).

More than 83% of the participants found that LearnWeb2.0 was (very) useful to search new resources, and more than 93% said that it was (very) useful to share and rate resources. 70% explicitly stated that they used LearnWeb2.0 to find additional resources for working on their competences. Regarding the GOT, more than 77% of participants found it (very) useful to define goals, and more than 90% said it was (very) useful to search for communities, competence profiles, competences, and resources. 60% of the participants explicitly indicated that they used GOT to find

additional resources for improving/developing their competences. Therefore, LearnWeb2.0 and the GOT seemed to be significantly useful to assist competence development in this pilot.

In conclusion we can say that most of the teachers were satisfied with the TENCompetence infrastructure. We believe that these participants will continue using it for keeping the professional contacts built during the pilot, and that they will collaborate in lifelong self-development as teachers. Our expectations are that in combination with the I\*Teach didactical methodology, TENCompetence could represent a useful approach for implementation of the MES strategy for involvement ICTs in education.

### **Acknowledgement**

This work is supported by the European Commission under the TENCompetence project [project No: IST-2004-02787].

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